INTT status @ 1008

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Commissioning list

Task	Person in Charge	Duration	Points	Beam condition	Other subsystem	Priority	Field	Trigger	Comment
Chip saturation study	DAQ: 1008 guys Analysis: Ryotaro Support: Cheng-Wei	10 mins for each	INTT in trigger mode Set1-1: ncollision100, and open_time 127 Set1-2: ncollision100, and open_time 110 Set1-3: ncollision100, and open_time 90 Set1-4: ncollision100, and open_time 80 Set1-5: ncollision100, and open_time 60 Set1-6: ncollision100, and open_time 40 Set1-7: ncollision100, and open_time 25 Set2: same open_time settings, while changing ncollision to be 2 Set3: same open_time settings, while changing ncollision to be 50	with collisions (with low rate)	With MBD, in global mode	High	Any	MBD	This is to study the chip hit saturation issue discovered on Dec 10 2024. Whether we still see the cutoff in the chip nhit distribution even with the open time of 128 BCO? We also need to check the cluster phi size distribution We can also try to learn the correlation between the open_time and nhits
Carried over hit study	DAQ: 1008 guys Analysis: Ryotaro Support: Cheng-Wei	10-15 mins (~1M to 1.5M events for each)	INTT in trigger mode Set1: ncollision 3, and open_time 60 Set2: ncollision 3, and open_time 127 Set3: ncollision 127, and open_time 127 Set4: ncollision 100, and open_time 60 (nominal setting, as ref.) (Short GTM busy window for this test if possible, but maybe not possible)	with collisions (prefer high trigger rate)	Local mode should be fine	High	Any	MBDNS	As of Nov 25 2024, I think we never have the dataset with very narrow ncollision for the event-mixed-up study With the statistic approach, in the reality, we just cannot distinguish b/w mix-up hits and the hits from real collisions. So it's good to have such a dataset that we have the potential to believe that any abnomal behavior found in the data can be really came from anything other than the really collisions. In addition, by comparing with the previous dataset with ncollision 100, we can possibly learn where the event mixup happened.
Timing coarse delay scan	DAQ: 1008 guys Analysis: Ryotaro Support: Genki	5 min x 6 points x 2 sets	lvl1 = 112, 113, 114, 115, 116, 117	With collisions	With MBD, standalone	High	Any	MBD	After GTM is finalized
DAC0 scan	DAQ: 1008 guys Analysis: Nao Support: Akitomo	5 min x 6 points x 2 sets	DAC0 = 15, 20, 25, 30, 35, 40	better to be with beam	Standalone	Middle	Any	MBD	Better to take data in the same condition as Run2024 Au+Au commissioning, i.e. with Au+Au beam, with other subsystems on.
Digital control test	DAQ: Takahiro Analysis: Tomoki Support: Itaru	5 min x 2 points x 2 sets	Digital Ctrl = 2, 10	With collisions	Standalone	High	Any	Any	First try the digital control test with pedestal data with no collisions. If it's not successful, retry to take data with collisions.
Renew chip/channel mask	DAQ: 1008 guys Analysis: Jaein Support: Rachid/Raul	1 min w/ FA	Need some iterations	With collisions	Standalone	Must	Any	Any	~~Can be finished before Au beam comes.~~ This work will should be performed AFTER 1 week of stable data taking using the current mask condition. Also need Raul to unmask FELIX chip masking
Single bunch crossing	DAQ: 1008 guys Analysis: ?? Support: ??	10 mins?	one run ncollision 100 one run small ncollision	single or two bunch crossing(s) with collisions	Join the MVTX commissioning	Low	Any	Any	We never join the MVTX commissioning data taking. I think it's a good idea to take at least one run with single bunch crossing or live. We can learn the noise level and also the beam background, and also fraction of the hit moved to the next bin
Hit rate study with/without collar	DAQ: 1008 guys Analysis: ?? Support: ??	10 mins?	one run ncollision 100 one run for each configuration small ncollision	single or two bunch crossing(s) with collisions	Join the MVTX commissioning	Low	Any	Any	

Done

Done

Done

Done

Done?

Done

Commissioning runs

2025/06/20 20:11	68007	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68006
2025/06/20 20:15	68008	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	127	127	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68006
2025/06/20 20:20	68009	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	3	127	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68006
2025/06/20 20:23	68010	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	3	60	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68006
2025/06/20 20:28	68012	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68011
2025/06/20 20:32	68013	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	127	127	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68011
2025/06/20 20:35	68014	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	3	127	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68011
2025/06/20 20:37	68015	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	3	60	Trigger rate for MBD is quite high enough. Do 2mins data taking instead.(Clock trigger rate is low enough) Global Run Number 68011
2025/06/20 20:42	68016	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	DigControl Test Map file (digcon_map_20250618.txt) Global Run Number 68011
2025/06/20 20:48	68017	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	DigControl Test Map file (digcon_map_20250618_another.txt) Global Run Number 68011
2025/06/20 20:54	68019	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	DigControl Test Map file (digcon_map_20250618.txt) Global Run Number 68018
2025/06/20 20:58	68020	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	DigControl Test Map file (digcon_map_20250618_another.txt) Global Run Number 68018
2025/06/20 21:00	68021	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	DigControl Test Map file (digcon_map_20250618_original.txt), here original means the digcon_map.txt file Global Run Number 68018
2025/06/20 21:05	68022	beam ▼	On ▼		2min	15kHz(MBD	All Felix	35	108	100	60	DigControl Test Map file (digcon_map_20250618_original.txt), here original means the digcon_map.txt file Global Run Number 68018

- We took special runs for hit carry-over and chip-by-chip digital control.
  - Private DST files (***_no_hot_special.root) have been processed
 - /sphenix/tg/tg01/commissioning/INTT/data/dst_files/2025/

Recent changes

- INTT2 Felix ch4 half-ladder was masked (as reported by Jaein last week)
  - At some point, we need to unmask the masked ladder then take data to confirm the current status

- open_time was changed from 60 to 127

- Felix channel mask removed to increase the number of live chips

Another issue on INTT2?

- INTT2 Felix channel 9, 12, 13 are frequently shows low gain and and/or unsynchronized hits

- (Hypothesis 1) Some issue on the ROC5S C port?
  - ch-9 (ROC5S-C1), ch-12 (ROC5S-C2), ch-13 (ROC5S-C3)
  - ROC5S has a known issue that the current value of one LV channel is lower than the nominal value

- (Hypothesis 2) INTT3 also shows a similar trend in the online hit-map. Those ladders are located at geometrically similar position and getting smaller number of hits than the other ladders for beam condition?
  - Test this Check with smaller DAC0 value

Intt Hit Map
Run 68000, Events: 309964, Fri Jun 20 16:10:22 2025

What happen?

intt2 run: 00068368 type: physics

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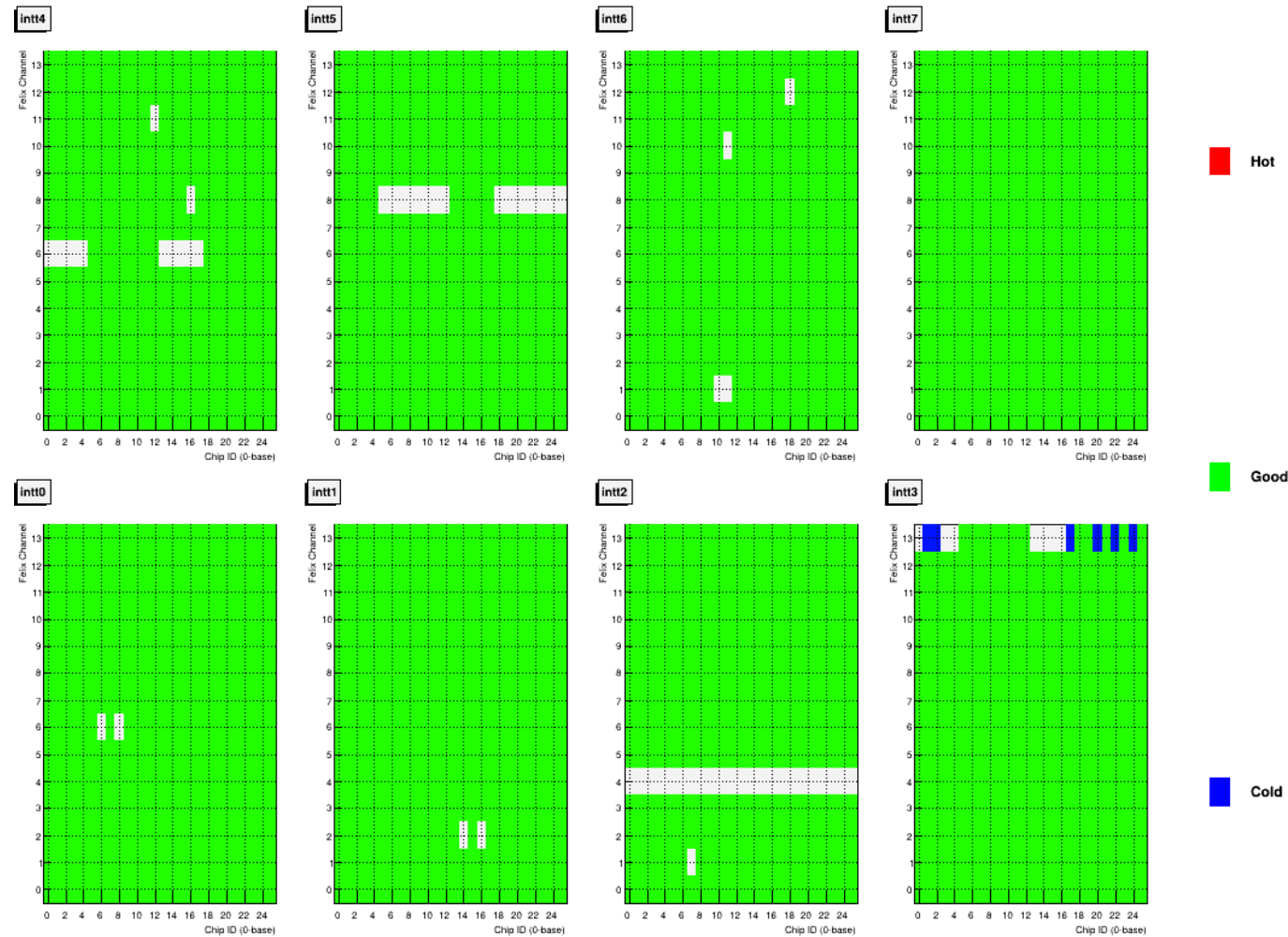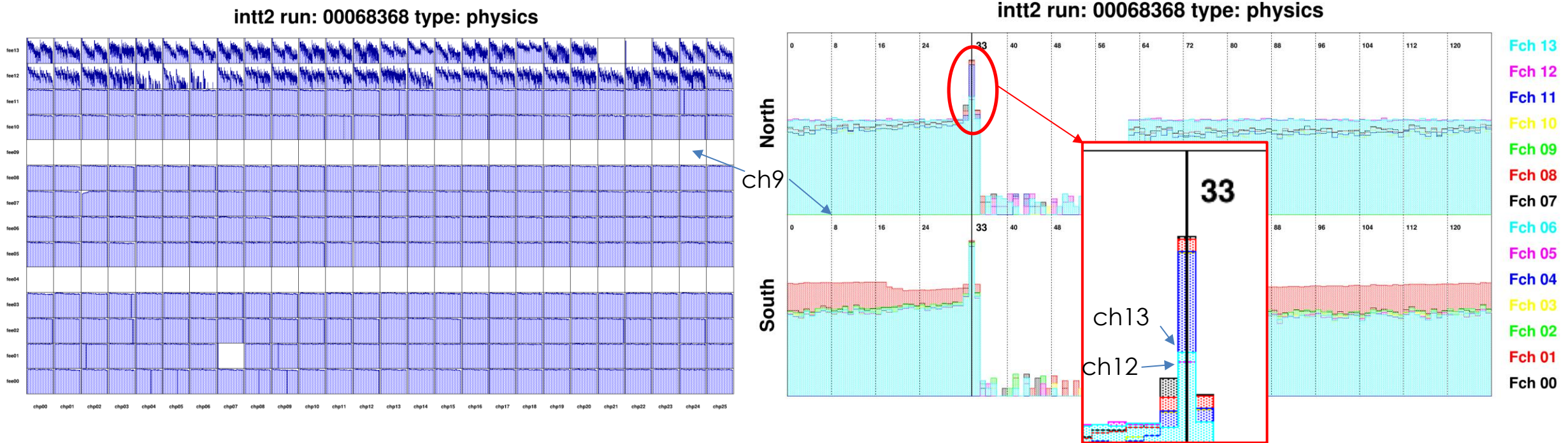
- GTM clock seems to be synchronized for the problematic ladders, but the collision BCO-diff peaks are very low and spread to entire BCO region
- Ch9 sometimes shows "no data"

No FELIX chip masking

- After unmasking the masked chips at FELIX, there is no problem for the DAQ but
  - Data size of intt1 become 1.5-2.0 times of the other intt servers
  - There are always two hot chips on the online monitor

- As far as this is acceptable, just let keep unmasking chips at FELIX level
  - Or maybe mask only intt1 Felix ch2 chip15 and 17? which always hot
  - Those may have some bad influence on the other chip on the ladder due to the "chip saturation" issue

Intt Hit Map
Run 68321, Events: 221208, Wed Jun 25 22:30:33 2025
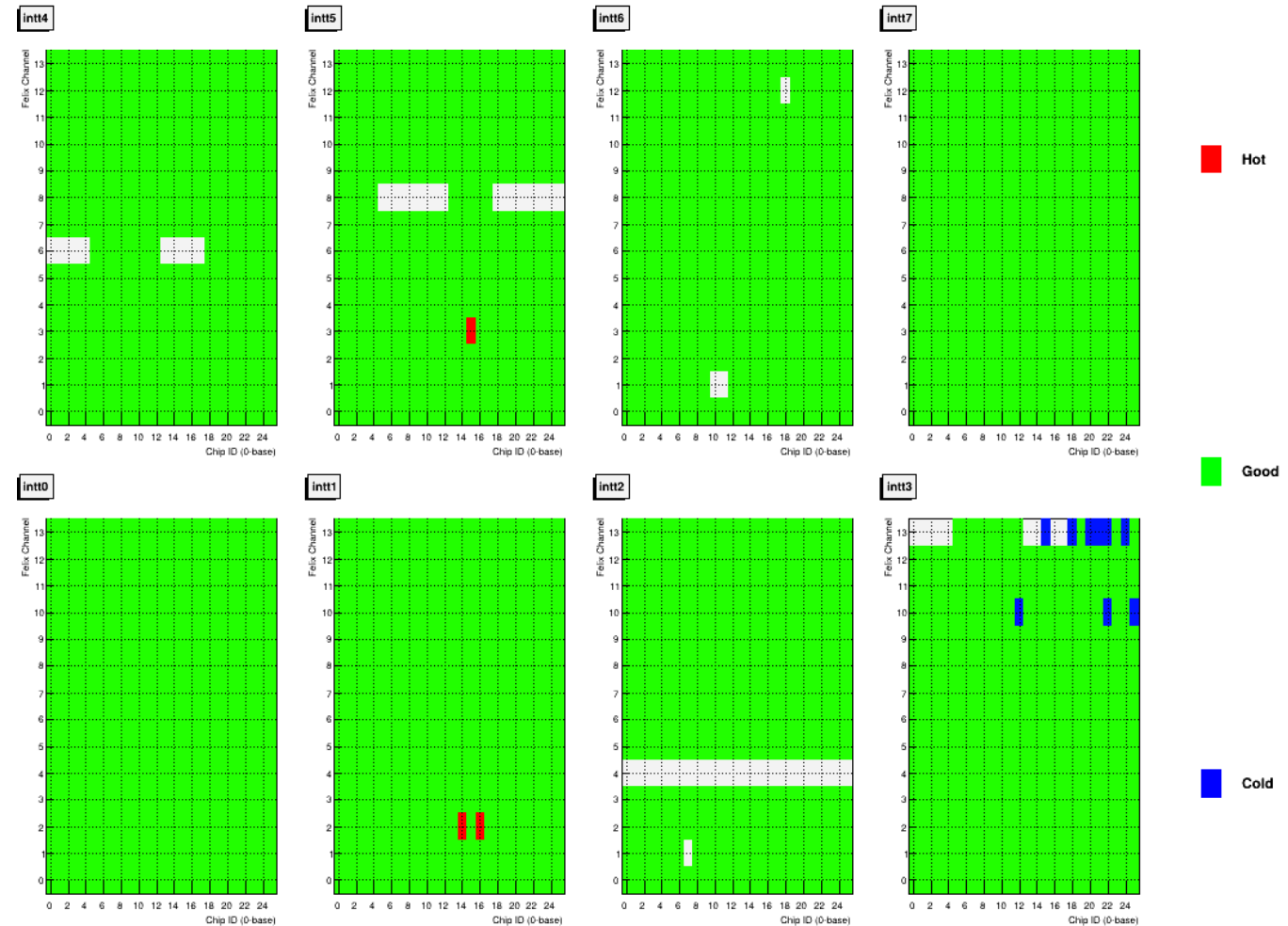
Ladder/Chip/Channel mask files

- Ladder (felix channel) mask
  - /home/phnxrc/INTT/sphenix_inttpy/run_scripts/close_FC_gate.txt
  - Read from intt_ext.py
  - Format: [intt server (intt0-7)] [Felix ch (0-13)] [Felix ch (0-13)] …
    - Example: intt4 5 7 11 → mask felix channel 5, 7, 11 for intt4

- Chip mask
  - Implemented in the Felix firmware by Raul
  - Need to prepare another file as a database input file.
  - Format (plan): [intt server] [Felix ch]:[chanID] [Felix ch]:[chanID] …

- Channel mask
  - /home/phnxrc/INTT/sphenix_inttpy/run_scripts/mask_ch_north(south).txt
    - Symbolic link to the version files, e.g mask_ch_north_v4.txt
  - Read from intt_ext.py
  - Format: [ROC (0-8)] [Felix ch (0-13)] [Port]

- Prepare a script to put those values into the daq database
  - Same as Joseph's python script